6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[EPA-HQ-OAR-2012-0393; FRL- 9779-5]

RIN 2060-AQ38

Air Quality: Revision to Definition of Volatile Organic Compounds – Exclusion of *trans* 1-chloro-3,3,3-trifluoroprop-1-ene [Solstice™ 1233zd(E)]

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: The EPA is taking direct final action to revise the definition of volatile organic compounds (VOCs) for purposes of preparing state implementation plans (SIPs) to attain the national ambient air quality standards (NAAQS) for ozone under title I of the Clean Air Act (CAA). This direct final action adds *trans* 1-chloro-3,3,3-trifluoroprop-1-ene (also known as Solstice™ 1233zd(E)) to the list of compounds excluded from the definition of VOCs on the basis that this compound makes a negligible contribution to tropospheric ozone formation.

DATES: This rule is effective **[INSERT DATE 90 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*]** without further notice, unless the EPA receives adverse comment by **[INSERT DATE 45 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*]**. If the EPA receives adverse comment, we will publish a timely withdrawal in the *Federal Register* informing the public that the final rule will not take effect.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2012-0393, by one of the following methods:

- *www.regulations.gov*. Follow the on-line instructions for submitting comments.
- *Email*: *a-and-r-Docket@epamail.epa.gov*, Attention Docket ID No. EPA-HQ-OAR-2012-0393.
- *Fax*: 202-566-1541, Attention Docket ID No. EPA-HQ-OAR-2012-0393.
- *Mail*: Docket ID No. EPA-HQ-OAR-2012-0393, Environmental Protection Agency, Mailcode: 6102T, 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.
- *Hand Delivery*: EPA Docket Center, U.S. Environmental Protection Agency, 1301 Constitution Avenue, NW, Room: 3334, Mail Code: 6102T, Washington, D.C. 20460, Attention Docket ID No. EPA-HQ-OAR-2012-0393. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2012-0393. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *www.regulations.gov*, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *www.regulations.gov*, or email. The *www.regulations.gov* website is an "anonymous access" system, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through *www.regulations.gov*, your email address will be automatically captured and included as part of the comment that is

placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm*.

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, i.e., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at the Docket ID No. EPA-HQ-OAR-2012-0393, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, D.C. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air and Radiaton is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: David Sanders, Office of Air Quality Planning and Standards, Air Quality Policy Division, Mail Code C539-01, Research Triangle Park, NC 27711; telephone: (919) 541-3356; fax number: 919-541-0824; email address: *sanders.dave@epa.gov*.

SUPPLEMENTARY INFORMATION:

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I. Why is the EPA using a direct final rule?

The EPA is publishing this direct final rule without a prior proposed rule because we view this as a noncontroversial action and anticipate no adverse comment. This action revises the EPA's definition of VOCs for purposes of preparing SIPs to attain the NAAQS for ozone under title I of the CAA. However, in the "Proposed Rules" section of this *Federal Register*, we are publishing a separate document that will serve as the

proposed rule to make this revision to the definition of VOCs if adverse comments are received on this direct final rule. We will not institute a second comment period on this action. Any parties interested in commenting must do so at this time. For further information about commenting on this rule, *see* the ADDRESSES section of this document.

If the EPA receives adverse comment, we will publish a timely withdrawal in the *Federal Register* informing the public that this direct final rule will not take effect. We would address all public comments in any subsequent final rule based on the proposed rule.

II. Does this action apply to me?

Entities potentially affected by this direct final rule include, but are not necessarily limited to, state and local air pollution control agencies that adopt and implement regulations to control air emissions of VOCs; industries involved in the manufacture or use of refrigerants, aerosol and non-aerosol solvents, and blowing agents for insulating foams; and manufacturers of refrigeration equipment, hot water heaters and waste heat recovery equipment.

III. Background

A. The EPA's VOC Exemption Policy

Tropospheric ozone, commonly known as smog, is formed when VOCs and nitrogen oxides (NOx) react in the atmosphere in the presence of sunlight. Because of the harmful health effects of ozone, the EPA and state governments limit the amount of VOCs that can be released into the atmosphere. VOCs are those organic compounds of carbon that form ozone through atmospheric photochemical reactions. Different VOCs

have different levels of reactivity. That is, they do not react to form ozone at the same speed or do not form ozone to the same extent. Some VOCs react slowly or form less ozone; therefore, changes in their emissions have less and, in some cases, very limited effects on local or regional ozone pollution episodes. It has been the EPA's policy that organic compounds with a negligible level of reactivity should be excluded from the regulatory VOC definition so as to focus VOC control efforts on compounds that do significantly increase ozone concentrations. The EPA also believes that exempting such compounds creates an incentive for industry to use negligibly reactive compounds in place of more highly reactive compounds that are regulated as VOCs. The EPA lists compounds that it has determined to be negligibly reactive in its regulations as being excluded from the definition of VOC. (40 CFR 51.100(s)).

The CAA requires the regulation of VOCs for various purposes. Section 302(s) of the CAA specifies that the EPA has the authority to define the meaning of "VOC," and hence what compounds shall be treated as VOCs for regulatory purposes. The policy of excluding negligibly reactive compounds from the VOC definition was first set forth in the "Recommended Policy on Control of Volatile Organic Compounds" (42 FR 35314, July 8, 1977) and was supplemented most recently with the "Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans" (Interim Guidance) (70 FR 54046, September 13, 2005). The EPA uses the reactivity of ethane as the threshold for determining whether a compound has negligible reactivity. Compounds that are less reactive than, or equally reactive to, ethane under certain assumed conditions may be deemed negligibly reactive and therefore suitable for exemption from the regulatory definition of VOC. Compounds that are more reactive than ethane continue to

be considered VOCs for regulatory purposes and therefore are subject to control requirements. The selection of ethane as the threshold compound was based on a series of smog chamber experiments that underlay the 1977 policy.

The EPA has used three different metrics to compare the reactivity of a specific compound to that of ethane: (i) the reaction rate constant (known as k_{OH}) with the hydroxyl radical (OH); (ii) the maximum incremental reactivity (MIR) on a reactivity per unit mass basis; and (iii) the MIR expressed on a reactivity per mole basis. Differences between these three metrics are discussed below.

The k_{OH} is the reaction rate constant of the compound with the OH radical in the air. This reaction is typically the first step in a series of chemical reactions by which a compound breaks down in the air and participates in the ozone-forming process. If this step is slow, the compound will likely not form ozone at a very fast rate. The k_{OH} values have long been used by the EPA as a metric of photochemical reactivity and ozone-forming activity, and they have been the basis for most of the EPA's previous exclusions of negligibly reactive compounds from the regulatory definition of VOC. The k_{OH} metric is inherently a molar-based comparison, i.e., it measures the rate at which molecules react.

The MIR, both by mole and by mass, is a more recently developed metric of photochemical reactivity derived from a computer-based photochemical model. This metric considers the complete ozone forming activity of a compound on a single day, and not merely the first reaction step.[1]

[1] Further explanation of the MIR metric can be found in Carter, 1994.

The MIR values for compounds are typically expressed as grams of ozone formed per gram of VOC (mass basis), but may also be expressed as grams of ozone formed per mole of VOC (molar basis). For comparing the reactivities of two compounds, use of the molar-based MIR values compares an equal number of molecules of the two compounds. Alternatively, use of the mass-based MIR values compares an equal mass of the two compounds, which involves a different numbers of molecules, depending on the relative molecular weights. The molar-based MIR comparison is consistent with the original smog chamber experiments that underlie the original selection of ethane as the threshold compound, in that these experiments compared equal molar concentrations of individual VOCs. It is also consistent with previous reactivity determinations based on k_{OH} values, which are inherently molar-based. By contrast, the mass-based MIR comparison is more consistent with how MIR values and other reactivity metrics have been applied in reactivity-based emission limits, such as the relatively recent national VOC emissions standards for aerosol coatings (40 CFR part 59 subpart E, promulgated in 2008), in which the mass fraction of each coating component is multiplied by its mass-based MIR value. Many older VOC regulations contain limits on the mass of VOC per volume of product without reactivity weighting. An example of this latter type of regulation is the EPA's regulation for limiting VOC emissions from architectural coatings (40 CFR part 59 subpart D, promulgated in 1998). This type of regulation allows substitution of a gram of one VOC for a gram of another VOC, without regard to the number of moles in a gram or individual reactivity values, thus making compliance simpler for regulated producers and enforcement simpler for air agencies. However, the fact that regulations are structured to limit VOC content by reactivity-weighted mass fraction or by mass for ease of

implementation and enforcement does not necessarily control whether VOC exemption decisions should be made on a weight basis as well.

The choice of the molar basis versus the mass basis for the ethane comparison can be significant. In some cases, a compound might be considered less reactive than ethane under the mass basis but not under the molar basis. For compounds with molecular weights higher than that of ethane, use of the mass basis results in more VOCs being classified as less reactive than ethane than does use of the molar basis.

The EPA has considered the choice between a molar or mass basis for the comparison to ethane in past rulemakings and guidance. In the Interim Guidance, the EPA stated:

> [A] comparison to ethane on a mass basis strikes the right balance between a threshold that is low enough to capture compounds that significantly affect ozone concentrations and a threshold that is high enough to exempt some compounds that may usefully substitute for more highly reactive compounds.
>
> When reviewing compounds that have been suggested for VOC-exempt status, EPA will continue to compare them to ethane using k_{OH} expressed on a molar basis and MIR values expressed on a mass basis.

The EPA's 2005 Interim Guidance also noted that concerns have sometimes been raised about the potential impact of a VOC exemption on environmental endpoints other than ozone concentrations, including fine particle formation, air toxics exposures, stratospheric ozone depletion and climate change. The EPA has recognized, however, that there are existing regulatory and non-regulatory programs that are specifically designed to address these issues, and the EPA continues to believe that the impacts of VOC exemptions on environmental endpoints other than ozone formation will be adequately addressed by these programs. The VOC exemption policy is intended to facilitate attainment of the ozone NAAQS, and questions have been raised as to whether

the agency has authority to use its VOC exemption policy to address concerns that are unrelated to ground-level ozone. In general, VOC exemption decisions will continue to be based solely on consideration of a compound's contribution to ozone formation. However, if the EPA determines that a particular VOC exemption is likely to result in a significant increase in the use of a compound and that the increased use would pose a significant risk to human health or the environment that would not be addressed adequately by existing programs or policies, the EPA reserves the right to exercise its judgment in deciding whether to grant an exemption.

B. Petition to List Solstice™ 1233zd(E) as an Exempt Compound

Honeywell, Inc. submitted a petition to the EPA on July 19, 2011, requesting that trans 1-chloro-3,3,3-trifluoroprop-1-ene (also known as Solstice™ 1233zd(E); CAS number 102687-65-0) be exempted from VOC control based on its low reactivity relative to ethane.[2] The petitioner indicated that Solstice™ 1233zd(E) may be used in variety of applications, including as a solvent in aerosol and non-aerosol applications, as a blowing agent in insulating foams for refrigerators/freezers and hot water heaters, and as a refrigerant in commercial chillers and waste heat recovery (Rankin cycle) systems. In the foam blowing applications, Solstice™ 1233zd(E) will compete with HFC-245fa, HFC-365mfc and cyclopentane. Solstice™ 1233zd(E) will compete with HFC-245fa and HFC-134a in refrigerant applications and with HCFC-225ca, HCFC-225cb, HFC-43-10mee and methyl chloroform in aerosol solvent applications.[3] These applications have been

[2] *Trans* 1-chloro-3,3,3-trifluoroprop-1-ene will also be marketed by Honeywell under the trade names Solstice™ N12 Refrigerant, Solstice™ Liquid Blowing Agent, Solstice™LBA, and Solstice™ Performance Fluid.

[3] Of the compounds listed here as competitors, all but cyclopentane have already been excluded by the EPA from the definition of VOC.

approved by the EPA's Significant New Alternatives Policy (SNAP) Program (*see* section III.D). [4]

To support its petition, Honeywell submitted several documents, including a technical report on the maximum incremental reactivity of Solstice™ 1233zd(E) (Carter, 2009); two peer-reviewed journal articles on its atmospheric chemistry, reaction rates, atmospheric lifetimes and ozone depletion potentials (Patten and Wuebbles, 2010; Sulbaek Anderson et al., 2008); a technical report on ozone depletion (Wang et al., 2011); a technical report on its global warming potential (GWP) (Wang et al., 2012); and a summary of toxicity studies for Solstice™ 1233zd(E) (Honeywell, 2011). All of these have been added to the docket for this action. In summarizing the content of these documents, Honeywell states that Solstice™ 1233zd(E) has low ozone reactivity, low GWP, low contribution to ozone depletion and low toxicity, and that the use of the compound avoids the fire risk of using cyclopentane as a foam blowing agent.

C. Premanufacture Notification Review of Solstice™ 1233zd(E)

The Toxics Substances Control Act (TSCA) requires the EPA to assess and prevent any unreasonable risks to human health and the environment before a new chemical substance is introduced into commerce. Section 5 of TSCA requires manufacturers and importers to notify the EPA before manufacturing or importing a new chemical substance. Under the Premanufacture Notification (PMN) Review Process, the EPA then performs a risk assessment on the new chemical substance to determine if an unreasonable risk may, or will, be presented by the expected use of the new substance.

[4] The SNAP program approval refers to Solstice™ 1233zd(E) as a substitute certain ODSs, rather than as a substitute for the currently marketed compounds with which it will compete.

Finally, the EPA makes risk management decisions and takes action to control any unreasonable risks posed by new chemical substances. Under TSCA, the EPA is allowed 90 days to review each substance, extendable to 180 days under certain conditions.

As a new chemical not yet introduced into commerce, Solstice™ 1233zd(E) has recently completed a PMN review on January 30, 2012. After considering all relevant data currently available, the EPA was unable to find any unreasonable risks to human health or the environment from the expected use of the substance. Based on this finding, the EPA did not find it necessary to take any actions to prevent unreasonable risk under TSCA. Once the EPA is informed that production of the compound has started, it will be added to the TSCA inventory of chemical substances that are produced or imported in the U.S.

D. Significant New Alternatives Policy Program Review of Solstice™ 1233zd(E)

The SNAP program is the EPA's program to evaluate and regulate substitutes for the ozone-depleting substances (ODSs) that are being phased out under the stratospheric ozone protection provisions of the CAA. In section 612(c) of the CAA, the agency is authorized to identify and publish lists of acceptable and unacceptable substitutes for class I or class II ozone-depleting substances.[5] The EPA's SNAP program has evaluated the use of Solstice™ 1233zd(E). The review considered information on the effects, if any, of the compound on stratospheric ozone depletion, tropospheric ozone, ecosystem effects from deposition and toxicity to humans. On August 10, 2012, the SNAP program published a determination finding Solstice™ 1233zd(E) acceptable for use as a foam blowing agent for certain products, as a refrigerant in new centrifugal chillers and as an

[5] Information on the SNAP program can be found on the following webpage: *www.epa.gov/ozone/snap*.

aerosol solvent. 77 FR 47768. However, the SNAP program is currently still reviewing Solstice™ 1233zd(E) for use as a refrigerant for non-mechanical heat transfer and as a solvent for cleaning or for adhesives and coatings. Thus, at this time, it would be a violation of the CAA and the SNAP program regulations for any person to introduce Solstice™ 1233zd(E) into interstate commerce for use in any of these end uses regulated by the SNAP program.

IV. The EPA's Assessment of the Petition

The EPA is taking direct final action to approve the petition for exemption of Solstice™ 1233zd(E) from the definition of VOC. This action is consistent with the Interim Guidance based on the three reactivity metric values for Solstice™ 1233zd(E) compared to the corresponding values for ethane; our inability in the Premanufacture Notification Review Program to find any unreasonable risks to human health or the environment from the expected use of the substance; our finding in the SNAP program review of this chemical that use of this chemical in currently allowed applications does not pose a significant risk to human health or the environment; and our confidence that the SNAP program will prevent the use of this chemical in any additional applications where such use would pose a significant risk to human health or the environment. We also believe that the much lower GWP of Solstice™ 1233zd(E) relative to one of the chemicals it can replace, as described in section IV.C, is an additional reason to approve the VOC exemption for this chemical and thus encourage its use, given that applying the Interim Guidance itself supports such approval.

A. Contribution to Tropospheric Ozone

The reaction rate of ethane with OH is 2.4 x 10^{-13} cm^3/molecule-sec. The corresponding reaction rate of Solstice™ 1233zd(E) for reaction with OH radical (k_{OH}) has been measured to be 4.40 x 10^{-13} cm^3/molecule-sec (Sulbaek Andersen et al., 2008); other reactions with ozone and nitrate radical were negligibly small. The difference between the two k_{OH} values is not significant; but still, Solstice™ 1233zd(E) is above the ethane benchmark.

The overall atmospheric reactivity of Solstice™ 1233zd(E) was studied in an experimental smog chamber and the chemical mechanism derived from this study was used to model the complete formation of ozone for an entire single day under "realistic" atmospheric conditions (Carter, 2009). Using the standard 39-city array of input conditions, Carter calculated a MIR value of 0.040 g O_3/g VOC for Solstice™ 1233zd(E) for "averaged conditions," versus 0.28 g O_3/g VOC for ethane.[6]

Table 1 presents the three reactivity metrics for Solstice™ 1233zd(E) as they compare to ethane.

Table 1 - Reactivities of ethane and Solstice™ 1233zd(E)

Compound	**k_{OH} (cm^3/molecule-sec)**	**Maximum incremental reactivity (MIR) (g O_3/mole VOC)**	**Maximum incremental reactivity (MIR) (g O_3/g VOC)**
Ethane	2.4 x 10^{-13}	8.4	0.28
Solstice™ 1233zd(E)	4.40 x 10^{-13}	5.22	0.040

Notes:

[6] In this action as in past exemption actions, the EPA is focusing on the MIR under "averaged conditions." Carter also calculated a MIR value of 0.042 g O3/g VOC for Solstice™ 1233zd(E) for the average of all city-specific scenarios, versus the corresponding MIR of 0.264 g O3/g VOC for ethane. There were no individual city-specific scenarios where Solstice™ 1233zd(E) was calculated to have a higher MIR than ethane.

1. k_{OH} value for ethane is from Atkinson et al., 2006 (page 3626).
2. k_{OH} value for Solstice™ 1233zd(E) is from Sulbaek Andersen et al., 2008.
3. Mass-based MIR value (g O3/g VOC**)** of ethane is from Carter, 2010 (page 178). The value of 0.28 is slightly different than the value of 0.268 reported in Carter, 2009. The EPA does not consider this slight difference to be material.
4. Mass-based MIR value of Solstice™ 1233zd(E) is from Carter, 2009.
5. Molar-based MIR (g O_3/mole VOC) values were calculated from the mass-based MIR (g O_3/g VOC) values using the number of moles per gram of the relevant organic compound.

From the data in Table 1, it can be seen that Solstice™ 1233zd(E) has a higher k_{OH} value than ethane, meaning that it initially reacts more quickly in the atmosphere than ethane. However, a molecule of Solstice™ 1233zd(E) is less reactive than a molecule of ethane in terms of complete ozone forming activity as shown by the molar-based MIR (g O_3/mole VOC) values. Also, a gram of Solstice™ 1233zd(E) has a lower MIR value than a gram of ethane. Thus, under the Interim Guidance Solstice™ 1233zd(E) is eligible to be exempted from the definition of VOC, on the basis of both mass-based and molar-based MIR.

According to the petitioner, in the foam blowing applications, Solstice™ 1233zd(E) will compete with HFC-245fa, HFC-365mfc and cyclopentane. Solstice™ 1233zd(E) will compete with HFC-245fa and HFC-134a in refrigerant applications and with HCFC-225ca, HCFC-225cb, HFC-43-10mee and methyl chloroform in aerosol solvent applications. These applications have been approved by the EPA's SNAP Program (*see* section III.D). [7] The EPA believes that market penetration by Solstice™ 1233zd(E) is more likely in foam blowing and refrigeration applications than in aerosol solvent applications. Given these known prospects for substitution, it is informative to

[7] The SNAP program approval refers to Solstice™ 1233zd(E) as a substitute certain ODSs, rather than as a substitute for the currently marketed compounds with which it will compete.

compare the ozone reactivity metric values for Solstice™ 1233zd(E) to the values for HFC-245fa, HFC-365mfc, cyclopentane, methyl chloroform and HFC-134a, although the Interim Guidance does not contemplate such comparisons among substitutes in every case.[8] Table 2 contains the ozone metrics for Solstice™ 1233zd(E), these five chemicals and ethane. The table shows that Solstice™ 1233zd(E) is lower than cyclopentane on all three reactivity metrics. Thus, it is reasonable to conclude that when Solstice™ 1233zd(E) is substituted for cyclopentane, less ozone will result. Solstice™ 1233zd(E) has higher values on all three metrics than the other compounds listed in Table 2, but it should be noted that the k_{OH} and MIR values for other compounds are extremely low even compared to those of ethane.

Table 2 - Reactivities of Solstice™ 1233zd(E) and five compounds for which it may substitute

Compound	k_{OH} (cm^3/molecule-sec)	Maximum incremental reactivity (MIR) (g O_3/mole VOC)	Maximum incremental reactivity (MIR) (g O_3/g VOC)
Solstice™ 1233zd(E)	4.40×10^{-13}	5.22	0.040
HFC-245fa	7.24×10^{-15}	0.106	0.0008
HFC-365mfc	7.12×10^{-15}	0.089	0.0006
Cyclopentane	5.02×10^{-12}	167	2.39
Methyl Chloroform	1.24×10^{-14}	0.654	0.0049
HFC-134a	4.59×10^{-15}	0.071	0.0007
Ethane	2.4×10^{-13}	8.4	0.28

Notes:
1. k_{OH} value for cyclopentane is from Carter, 2010 (page 211).
2. k_{OH} value for HFC-245fa is from Carter, 2010 (page 228).

[8] HCFC-225ca and HCFC-225cb are banned as of January 1, 2015, and therefore have not been included in this comparison.

3. k_{OH} value for HFC-365mfc is from Carter, 2010 (page 229).
4. k_{OH} value for methyl chloroform is from Carter, 2010 (page 228).
5. k_{OH} value for HFC-134a is from Carter, 2010 (page 228).
6. Mass-based MIR value (g O_3/g VOC) of cyclopentane is from Carter, 2010 (page 178).
7. Mass-based MIR value of HFC-245fa is from Carter, 2010 (page 202).
8. Mass-based MIR value of HFC-365mfc is from Carter, 2010 (page 202).
9. Mass-based MIR value of methyl chloroform is from Carter, 2010 (page 202).
10. Mass-based MIR value of HFC-134a is from Carter, 2010 (page 202).
11. Molar-based MIR (g O_3/mole VOC) values were calculated from the mass-based MIR (g O_3/g VOC) values using the number of moles per gram of the relevant organic compound.

As stated in section IV.C, Solstice™ 1233zd(E) has a very low GWP. Global warming is predicted to exacerbate high ozone concentrations (U.S. EPA, 2009; Jacob and Winner, 2009), so directionally the lower GWP of Solstice™ 1233zd(E) compared to HFC-245fa will also help reduce tropospheric ozone concentrations.

In summary, the EPA believes that Solstice™ 1233zd(E) qualifies as negligibly reactive with respect to its contribution to tropospheric ozone formation.

B. Likelihood of Risk to Human Health or the Environment

Stratospheric Ozone Depletion - The SNAP program review of Solstice™ 1233zd(E) described in section III.D considered available information regarding ozone depletion and concluded that from a stratospheric ozone depletion perspective, the compound is acceptable as a replacement for the ozone-depleting substances CFC-11 and HCFC-123 for use in certain refrigerant applications, a replacement for CFC-11 and HCFC 141b in foam blowing and a replacement for CFC-113, methyl chloroform, HCFC-141b, and HCFC-225ca, HCFC-225cb and blends thereof for use in aerosol solvent applications .Estimates of Solstice™ 1233zd(E)'s potential to deplete the ozone layer found that even with worst case estimates of emissions which assume that this

compound would substitute for all compounds it could replace, the impact on global atmospheric ozone abundance would be statistically insignificant. The emissions of Solstice™ 1233zd(E) in its refrigerant application will be limited given it is subject to the venting prohibition under section 608(c)(2) of the CAA and the EPA's implementing regulations codified at 40 CFR 82.154(a)(1). Solstice™ 1233zd(E) has an ozone-depleting potential (ODP) of 0.00024 to 0.00034. This is roughly one order of magnitude higher than the ODPs of HFCs used in substitute refrigerants and foam blowing agents which are considered to have zero ODP, including HFC-134a and HFC-125. Solstice™ 1233zd(E)'s ODP is well below that of CFC-11, HCFC- 123 and HCFC-141b (with ODPs ranging from 0.01 to 1.0), the ODSs which it replaces in refrigerants and foam blowing applications. The ODP of Solstice™ 1233zd(E) is comparable to the ODPs of trans-1,2- dichloroethylene and trichloroethylene and an order of magnitude lower than the ODP of perchloroethylene, other substitutes in the aerosol solvents end use that are not regulated as ODSs. Solstice™ 1233zd(E)'s ODP is well below those of methyl chloroform, CFC- 113, HCFC-141b, HCFC-225ca and HCFC-225cb (with ODPs ranging from 0.02 to 0.85), the ODSs it replaces in aerosol solvents.

Health and Environmental Risks - As described in section III.C, Solstice™ 1233zd(E) has recently completed a PMN review on January 30, 2012. After considering all relevant data currently available, the EPA was unable to find any unreasonable risks to human health or the environment from the expected use of the substance. Based on this finding, the EPA did not find it necessary to take any actions to prevent unreasonable risk under TSCA.

The SNAP program review of Solstice™ 1233zd(E) described the potential health effects of Solstice™ 1233zd(E) as being common to many refrigerants, including many of those already listed as acceptable under SNAP. Potential health effects of this substitute include serious eye irritation, skin irritation and frostbite. The EPA anticipates that users will be able to meet the manufacturer's recommended workplace exposure limit and address potential health risks by following requirements and recommendations in the material safety data sheet and in any other safety precautions common to the refrigeration and air conditioning industry and the foam blowing industry.

Solstice™ 1233zd(E) is not flammable.

Sulbaek Andersen et al., 2008, states that Solstice™ 1233zd(E) is not expected to undergo wet or dry deposition to an appreciable extent.

C. Global Warming Potential

Solstice™ 1233zd(E) has a 100-yr GWP reported as 4.7 to 7 and an atmospheric lifetime of approximately 26 to 31 days or less. Solstice™ 1233zd(E)'s GWP of 4.7 to 7 is lower than or comparable to that of other acceptable substitutes for ODSs in the same end uses. The notice for the EPA's determination under the SNAP program provides specific GWP comparisons to these other acceptable substitutes. 77 FR 47768, August 10, 2012. Solstice™ 1233zd(E) is expected to compete directly in the foam blowing application market with the ODS-substitutes HFC-245fa (GWP of 1030) and HFC-365mfc (GWP of 794) which have much higher GWPs than that for Solstice™ 1233zd(E). It will also compete with cyclopentane which has a GWP of less than 0.1 (UNEP, 1994) which is lower than for Solstice™ 1233zd(E). Because of the much higher GWPs of HFC-245fa and HFC-365mfc, the net global warming effect of increased use of

Solstice™ 1233zd(E) in place of HFC-245fa, HFC-365mfc and cyclopentane will depend on the pattern of substitutions that takes place in the future, but is likely to be advantageous as long as the amounts of displaced HFC-245fa and HFC-365mfc are not much less than the amount of displaced cyclopentane.

D. Conclusions

In summary, the EPA finds that Solstice™ 1233zd(E) qualifies as negligibly reactive with respect to its contribution to tropospheric ozone formation. In addition, we believe that risks not related to tropospheric ozone associated with currently allowed uses of the chemical are acceptable, and that any new or increased risk from potential new uses are adequately addressed by other existing programs and policies, specifically the SNAP program. We also believe that the comparable or lower global warming potential of Solstice™ 1233zd(E) compared to other acceptable substitutes and in particular compared to HFC-245fa, as described in section IV.C, is an additional reason to approve the Solstice™ 1233zd(E) petition given that applying the Interim Guidance itself supports such approval.

V. Direct Final Action

The EPA is responding to the petition by revising its definition of VOC at 40 CFR 51.100(s) to add Solstice™ 1233zd(E) to the list of compounds that are exempt from the regulatory definition of VOC because they are negligibly reactive, on the basis that it is less reactive than ethane on both a mass and a molar MIR basis. If an entity uses or produces any of this compound and is subject to the EPA regulations limiting the use of VOC in a product, limiting the VOC emissions from a facility, or otherwise controlling the use of VOC for purposes related to attaining the ozone NAAQS, then this compound

will not be counted as a VOC in determining whether these regulatory obligations have been met. Emissions of this compound will not be considered in determining whether a proposed new or modified source triggers the applicability of Prevention of Significant Deterioration (PSD) requirements, in areas where the PSD program is implemented by the EPA or a delegated state, local or tribal agency. This action may also affect whether this compound is considered a VOC for state regulatory purposes to reduce ozone formation, if a state relies on the EPA's definition of VOC. States are not obligated to exclude from control as a VOC those compounds that the EPA has found to be negligibly reactive. However, no state may take credit for controlling this compound in its ozone control strategy.

VI. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is not a "significant regulatory action" under the terms of Executive Order 12866 (58 FR 51735, October 4, 1993), and is therefore not subject to review under Executive Orders 12866 and 13563 (76 FR 3821, January 21, 2011).

B. Paperwork Reduction Act

This action does not impose an information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. Burden is defined at 5 CFR 1320.3(b). It does not contain any recordkeeping or reporting requirement.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking

requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the proposed rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations and small governmental jurisdictions.

For purposes of assessing the impacts of this notice on small entities, small entity is defined as: (1) A small business that is a small industrial entity as defined in the U.S. Small Business Administration (SBA) size standards. (*See* 13 CFR 121.); (2) A governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) A small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's direct final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. In determining whether a rule has a significant economic impact on a substantial number of small entities, the impact of concern is any significant adverse economic impact on small entities, since the primary purpose of the regulatory flexibility analyses is to identify and address regulatory alternatives "which minimize any significant economic impact of the rule on small entities." 5 USC 603 and 604. Thus, an agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, or otherwise has a positive economic effect on all of the small entities subject to the rule. This direct final rule removes Solstice™ 1233zd(E) from the definition of VOCs and thereby relieves users of the compound from requirements to control emissions of the

compound. We have therefore concluded that today's direct final rule will relieve regulatory burden for all affected small entities.

D. Unfunded Mandates Reform Act

This action contains no federal mandates under the provisions of Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), 2 U.S.C. 1531-1538 for state, local or tribal governments or the private sector. The action imposes no enforceable duty on any state, local or tribal governments or the private sector. Therefore, this action is not subject to the requirements of sections 202 and 205 of the UMRA.

This action is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. This direct final rule removes Solstice™ 1233zd(E) from the definition of VOCs and thereby relieves users of the compound from requirements to control emissions of the compound.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This direct final rule removes Solstice™ 1233zd(E) from the definition of VOCs and thereby relieves users from requirements to control emissions of the compound. Thus, Executive Order 13132 does not apply to this rule.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). It would not have substantial direct effects on tribal governments, on the relationship between the federal government and Indian Tribes, or on the distribution of power and responsibilities between the federal government and Indian Tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this rule.

G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

This action is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in EO 12866. This action's health and risk assessments are contained in section IV.B. of this preamble and within the docket for this rulemaking. While this direct final rule is not subject to the Executive Order, the EPA has reason to believe that ozone has a disproportionate effect on active children who play outdoors (62 FR 38856; 38859, July 18, 1997). The EPA has not identified any specific studies on whether or to what extent Solstice™ 1233zd(E) may affect children's health.

H. Executive Order 13211: Actions that Significantly Affect Energy Supply, Distribution or Use

This action is not subject to Executive Order 13211 (66 FR 28355 (May 22, 2001)), because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law 104-113, section 12(d), (15 U.S.C. 272 note) directs the EPA to use voluntary consensus standards in its regulatory activities unless to do so would be

inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs the EPA to provide Congress, through OMB, explanations when the agency decides not to use available and applicable voluntary consensus standards. This rulemaking does not involve technical standards. Therefore, the EPA has not considered the use of any voluntary consensus standards.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629, Feb. 16, 1994) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies and activities on minority populations and low-income populations in the United States.

The EPA has determined that this direct final rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it does not affect the level of protection provided to human health or the environment.

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which

includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. The EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives and the Comptroller General of the United States prior to publication of the rule in the *Federal Register*. A major rule cannot take effect until 60 days after it is published in the *Federal Register*. This action is not a "major rule" as defined by 5 U.S.C. 804(2). This rule will be effective on **[INSERT DATE 90 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*]**.

L. Judicial Review

Under section 307(b)(1) of the CAA, petitions for judicial review of this action must be filed in the United States Court of Appeals for the District of Columbia Circuit Court within 60 days from the date the final action is published in the *Federal Register*. Filing a petition for review by the Administrator of this final action does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review must be final, and shall not postpone the effectiveness of such action. Thus, any petitions for review of this action related to the exemption of Solstice™ 1233zd(E) from the definition of VOC must be filed in the Court of Appeals for the District of Columbia Circuit within 60 days from the date final action is published in the *Federal Register*.

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List of Subjects in 40 CFR Part 51

Environmental protection, Administrative practice and procedure, Air pollution control, Ozone, Reporting and recordkeeping requirements, Volatile organic compounds.

Dated: February 4, 2013

Lisa P. Jackson,
Administrator.

For reasons set forth in the preamble, part 51 of chapter I of title 40 of the Code of Federal Regulations is amended as follows:

PART 51-REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS.

Subpart F—Procedural Requirements

1. The authority citation for Part 51, Subpart F, continues to read as follows:

Authority: 42 U.S.C. 7401, 7411, 7412, 7413, 7414, 7470-7479, 7501-7508, 7601, and 7602.

§ 51.100 – [Amended]

2. Section 51.100 is amended at the end of paragraph (s)(1) introductory text by removing the words "and perfluorocarbon compounds which fall into these classes:" and adding in their place a semi-colon and the words "*trans* 1-chloro-3,3,3-trifluoroprop-1-ene; and perfluorocarbon compounds which fall into these classes:".

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